

# इंटरनेट

# मानक

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IS 4639-4 (2000): Petroleum Industry - Terminology, Part 4: Refining [PCD 3: Petroleum, Lubricants and their Related Products]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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भारतीय मानक  
पेट्रोलियम उद्योग — शब्दावली  
भाग 4 परिशोधन  
(पहला पुनरीक्षण)

*Indian Standard*  
PETROLEUM INDUSTRY — TERMINOLOGY  
PART 4 REFINING  
( *First Revision* )

ICS 10.040.75; 75.080

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**BUREAU OF INDIAN STANDARDS**  
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## FOREWORD

This Indian Standard (Part 4) (First Revision) which is identical with ISO 1998-4 : 1998 'Petroleum industry — Terminology : Part 4 Refining' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of Petroleum Products Sectional Committee and approval of the Petroleum, Coal and Related Products Division Council.

This standard was first published in 1968 with a view to eliminate the ambiguity arising from different interpretations of terms used in petroleum trade and industry, and to establish a generally recognized terms. Since the industry has progressed manifolds over the years, a need was felt to bring in newer terms. The Committee, therefore decided to revise this standard to completely align with ISO 1998-4 : 1998 under the dual numbering system. Accordingly, the title has been changed as 'Petroleum industry — Terminology : Part 4 Refining'.

It is envisaged to issue this standard in eight different parts, each dealing with a specific aspect. The other parts in this series are as under:

- Part 1 Raw materials and products
- Part 2 Properties and tests
- Part 3 Exploration and production
- Part 5 Transport, storage, distribution
- Part 6 Measurement
- Part 7 Miscellaneous terms
- Part 8 General and index

The English version of the text of ISO standard has been retained without deviations for publication as Indian Standard. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

For tropical countries like India, the standard temperature and the relative humidity shall be taken as  $27 \pm 2^{\circ}\text{C}$  and  $65 \pm 5$  percent respectively.

## Indian Standard

# PETROLEUM INDUSTRY — TERMINOLOGY

## PART 4 REFINING

### ( First Revision )

## 1 Scope

This part of ISO 1998 consists of a list of terms, in use in the petroleum industry in area of refining, together with the corresponding definitions in the two languages.

ISO 1998 is intended to cover the purposes of the part of the petroleum industry dealing with crude oils and petroleum products, that means all related operations arising from the production field to the final user. It is not intended to cover either petroleum equipment, or any operation in the field. However, some pieces of equipment or some operations of exploration and production are defined. The corresponding terms were introduced only when they appear in a definition of a product or process and when their definition was found necessary for understanding or for avoiding any ambiguity. Where a terminology of petroleum equipment is needed, it corresponds to the scope of ISO/TC 67, *Materials, equipment and offshore structure for petroleum and natural gas industries*.

## 2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1998-99:—<sup>1)</sup> *Petroleum industry—Terminology—Part 99: General and index*.

## 3 Term numbering

The general classification and numbering system

1) To be published.

used in ISO 1998 employs digits grouped in three categories:

x.yy.zzz

where

- x is the part number of ISO 1998, in this case Part 4;
- yy is the subcategory in which the term appears. Part 4 has six subcategories:
  - 10 operation
  - 20 processing without conversion
  - 30 processing with conversion
  - 40 petrochemical process
  - 50 equipment—utilities
  - 60 miscellaneous

zzz is the serial number of the individual term.

## 4 Index

See ISO 1998-99.

## 5 Order of listing

Terms are listed in serial number order.

### 4.10 Operations

#### 4.10.010

##### reflux

in distilling operations portion of the distillate returning to the column

#### 4.10.011

##### reflux ratio

ratio of the volume of the reflux from the top to the volume of distillate withdrawn from a distillation column

#### 4.10.012

##### internal reflux

liquid that returns inside a distillation column in normal operation

**4.10.020**

**distillation pressure**

pressure measured at the top of the column during a distillation operation

**4.10.030**

**dynamic hold-up**

quantity of material held at a given moment in a distillation column in normal operation

**4.10.031**

**static hold-up**

quantity of material retained in a distillation column when the distillation is finished, i.e. after the tower or packing is allowed to drain

**4.10.040**

**pressure drop**

pressure difference between two points in a fluid

NOTE In a plate-type column, the pressure drop is at least equal to the sum of the depths of liquid on the plates which the vapour traverses throughout the column.

**4.10.050**

**flash vaporization**

**instantaneous vaporization**

partial or total vaporization obtained by sudden reduction of pressure

**4.10.051**

**vaporization rate**

**boil-up rate**

volume of liquid vaporized per unit of time

**4.10.052**

**flooding**

phenomenon that upsets the normal operation of a distillation column due to a excessive speed of vapour travelling up the column, preventing liquid from flowing

**4.10.053**

**steamage**

**steamout**

expulsion of a product by injection of steam

**4.10.060**

**gap**

interval of temperature separating the final boiling point of one fraction from the initial point of the following fraction in a distillation under standard conditions

**4.10.061**

**overlap**

interval of temperature common to two successive fractions

NOTE It is expressed as the interval of temperature between the initial boiling point of the heavier fraction and the final boiling point of the lighter fraction.

**4.10.065**

**tower top temperature**

temperature of the saturated vapour phase measured at the top of the column, during a distillation operation

**4.10.070**

**filter cake**

relatively compact bed of solid or semi-solid material formed on the filter during a filtration operation

**4.10.080**

**theoretical plate**

theoretical element of a distillation column in which the escaping vapour is in thermodynamic equilibrium with the related liquid

**4.20 Processing without conversion**

**4.20.111**

**atmospheric distillation**

distillation of a feedstock at approximately atmosphere pressure with the distillate fractions being separated into a number of appropriate boiling ranges for further processing

NOTE The residue, normally that portion boiling above 350°C to 380°C, may be used directly as a fuel component, or subjected to further processing.

**4.20.112**

**topping**

**skimming**

nowadays called atmospheric distillation

cf. **atmospheric distillation** (4.20.111)

**4.20.113**

**vacuum distillation**

distillation of a feedstock, largely or wholly composed of material boiling above 350 °C at atmospheric pressure, under reduced pressure to avoid cracking reactions, to an atmospheric equivalent temperature of 490 °C to 550 °C

NOTE The distillate fraction is used as a feedstock for other processes, including catalytic and hydrocracking, lubricating

oil manufacture, needle-coke production, etc. The residue may also be used as a feedstock for thermal cracking or bitumen manufacture, or may be used directly as a fuel component.

#### 4.20.114

##### **extractive distillation**

distillation process characterized by the fact that the relative positions of boiling points of components are influenced by the selection of an appropriate solvent

NOTE The process is, for example, used in the separation of butadiene from a mixture of butanes, butenes and butadiene, with acetonitrile as solvent.

#### 4.20.115

##### **redistillation**

fractional distillation of a petroleum product that has already been distilled in order to obtain narrower fractions

#### 4.20.200

##### **depropanization**

process for the separation of  $C_3$  hydrocarbons from a mixture of petroleum hydrocarbons

#### 4.20.205

##### **debutanization**

process for the separation of  $C_4$  hydrocarbons from a mixture of petroleum hydrocarbons

#### 4.20.210

##### **depentanization**

process for the separation of  $C_5$  hydrocarbons from a mixture of petroleum hydrocarbons

#### 4.20.215

##### **dewaxing**

process that either removes paraffin and microcrystalline waxes from a feedstock, or converts them to compounds of lower molecular mass and/or changed molecular structure

#### 4.20.220

##### **de-asphalting**

solvent refining whereby the asphaltic constituents are precipitated and separated from certain petroleum fractions

#### 4.20.225

##### **de-oiling**

reduction of the oil content of a wax or petrolatum

NOTE This operation can be effected either by sweating or by selective extraction of the oil.

#### 4.20.230

##### **drying of gases**

processes that either remove the more readily condensable hydrocarbons from a stream of hydrocarbon gases, or remove water from gases after wet treatment processes

NOTE Both processes are carried out under reduced pressure.

#### 4.20.235

##### **desalting**

process for the removal of mineral salts (mostly chlorides) from feedstocks prior to processing, particularly distillation

NOTE Desalting reduces the alkali metals content in residues, and reduces the potential for acid formation in overhead fractions.

#### 4.20.300

##### **fractionation**

separation of a product into several fractions by an appropriate technique such as distillation or crystallization

#### 4.20.305

##### **stripping**

fractionation process, closely related to distillation by which undesired volatile components are separated from a liquid mixture by fractional evaporation

NOTE Stripping is generally effected by the introduction of steam, by the reduction of pressure, by the vapour generated in a reboiler or a combination of these.

#### 4.20.310

##### **stripping of liquids**

removal of the light components from a petroleum product by injection of inert gas or steam

#### 4.20.320

##### **solvent extraction**

fractionation process based upon the difference in solubility, in a given solvent of the various constituents of the mixture to be fractionated

NOTE The process is, for example, used in the separation of aromatics from gasoline or kerosine fractions.

#### 4.20.400

##### **sweetening**

process for improving the odour of a light distillate or reducing its corrosiveness, consisting in removing hydrogen sulfide and mercaptans or converting the latter to disulfides

NOTE Before treatment, the distillate is termed sour; after treatment, it is termed sweet.



**4.20.401**

**doctor treatment**

sweetening process used for light distillates in which sodium plumbite and sulfur are employed to convert certain sulfur compounds

**4.20.410**

**compounding**

mixing of fatty oils of vegetable or animal origin with mineral lubricating oils with a view to obtaining a product of required characteristics

**4.20.420**

**percolation**

slow passage of a liquid through a bed of solid absorbent, the particle size of which may vary within wide limits

**4.20.430**

**repulping**

operation consisting of taking into suspension in a solvent the filter cake resulting from solvent dewaxing and subjecting it to a further filtration with the object of increasing the yield of dewaxed oil and lowering the oil content of the slack wax obtained from the cake

**4.20.440**

**stabilization**

process of separating light hydrocarbon fractions from crude petroleum or from gasoline, to yield a product of lower vapour pressure

**4.20.445**

**sweating**

separation of liquid hydrocarbons from certain slack waxes by the action of slow progressive heating

**4.20.450**

**de-blooming**

process for the complete removal of **bloom** (2.10.092)

NOTE In the petroleum industry, this treatment is applied to domestic kerosine and certain white oils.

**4.20.460**

**acid and earth treatment**

refining process used for decolorizing or purifying

**4.20.510**

**edeleanu process**

process for the removal of aromatic hydrocarbons

from kerosine or lubricating oils by the use of liquid sulfur dioxide as a solvent, now also used for the manufacture of high-grade lubricating oils

**4.20.520**

**solutizer process**

regenerative process for removing heavy mercaptans from gasoline

**4.20.531**

**reclaiming**

processing used, before oil recycling, to remove the insoluble contaminants and make these oils suitable for further use

NOTE This process may include operations such as settling, heating, dehydration, filtration, centrifugation.

**4.20.532**

**re-refining**

process used, in oil recycling, to produce high-quality base oils for the manufacture of lubricants or other petroleum products

NOTE The re-refining process may include distillation, hydrotreatment and/or treatments using acid, caustic soda, solvent, clay and/or other chemicals.

**4.30 Processing with conversion**

**4.30.010**

**cracking**

reduction in average molecular mass of the hydrocarbon constituents of a feedstock by the breakage of bonds within hydrocarbon molecules

NOTE The objective is to produce lighter components which may be removed from the resulting product.

**4.30.020**

**thermal cracking**

**cracking** (4.30.010) obtained by the action of temperature and pressure

**4.30.025**

**visbreaking**

mild **thermal cracking** (4.30.020) process where the lower molecular mass products are retained in the resulting product, thus reducing its viscosity when compared to the feedstock

**4.30.030**

**catalytic cracking**

**cracking** (4.30.010) obtained in the presence of a catalyst

#### 4.30.031

##### **fluid catalytic cracking**

cracking process whereby a finely divided catalyst is continuously moved from reactor to regenerator and back to the reactor

NOTE The catalyst is kept in a fluid state by means of oil vapour, steam or air, in reactor, stripper and regenerator respectively.

#### 4.30.040

##### **combination cracking**

process whereby the products from cracking processes are combined with the residue from atmospheric distillation of crude oils and redistilled oils

NOTE Products from reforming processes may also be included in the redistillation. The higher boiling range products from this redistillation are frequently recirculated as feed to the cracking processes.

#### 4.30.050

##### **hydrocracking**

process combining cracking and hydrogenation

#### 4.30.060

##### **steam cracking**

cracking of a hydrocarbon feedstock in the presence of steam to produce hydrogen, olefins, carbon oxides and high aromatic products

#### 4.30.110

##### **reforming**

thermal or catalytic process applied to light petroleum fractions, which modifies the structure of certain hydrocarbons by cyclization of some iso-paraffins and dehydrogenation of naphthenes

NOTE The lightest aromatics produced are frequently extracted for chemical manufacture and, more recently, for environmental concerns.

#### 4.30.120

##### **catalytic reforming**

reforming in the presence of a catalyst

NOTE Specifically applied to the upgrading of feedstocks for motor gasoline manufacture, the process also produces hydrogen of high purity, which is a valuable constituent of hydroprocessing, and a significant yield of saturated LPGs.

#### 4.30.121

##### **platforming**

catalytic reforming process where the catalyst contains platinum and/or other noble metals

NOTE This term is a registered trade mark. This information is given for the convenience of users of this part of ISO 1998

and does not constitute an endorsement by ISO of this process.

#### 4.30.122

##### **hydroforming**

catalytic reforming of heavier gasoline feedstocks under higher hydrogen partial pressures

#### 4.30.200

##### **hydrodesulfurization**

process for the removal of sulfur from petroleum products by treatment with hydrogen in the presence of a catalyst

#### 4.30.210

##### **cyclization**

conversion of an open-chain organic compound into one having a closed ring structure

#### 4.30.220

##### **isomerization**

alteration of the structure of organic compounds without changing their basic formula

NOTE This term refers in particular to the conversion of straight chain hydrocarbons to branched chain hydrocarbons.

#### 4.30.300

##### **coking**

process of severe thermal cracking and successive polymerization that converts a heavy feedstock into lighter fractions, including gases, and petroleum coke

#### 4.30.310

##### **fluid coking**

coking process where the velocity of the feedstock is maintained to produce coke as small particles which can be continuously removed

#### 4.30.320

##### **delayed coking**

two-stage coking process where the final coke formation is achieved by low-velocity, high-temperature passage through a drum

### 4.40 Petrochemical process

#### 4.40.100

##### **alkylation**

thermal or catalytic reaction of a olefinic hydrocarbon to an iso-paraffin or aromatic hydrocarbon

NOTE According to the French nomenclature, the right term in French should be "alcoylation" but in practice "alkylation" is more generally used.

#### 4.40.200

##### **aromatization**

reforming process which produces aromatic hydrocarbons from appropriate feedstocks

#### 4.40.300

##### **polimerization**

reaction of two or more identical unsaturated molecules to form a single molecule having a basic formula which is a multiple of that of the original molecule

#### 4.40.301

##### **copolymerization**

extension of the operation of polymerization to two or more different molecules

### 4.50 Equipment — Utilities

#### 4.50.010

##### **hydroskimming plant**

group of units devoted exclusively to distillation and reforming and possibly desulfurization

#### 4.50.105

##### **pipe-still**

furnace fitted with pipes in which a crude oil or any other petroleum product is heated before entering treatment apparatus, for example, a distillation column

#### 4.50.110

##### **soaker**

(thermal cracking) furnace or part of a furnace heated so as to main the charge at a given temperature for a certain time of residence

#### 4.50.200

##### **fractionating column**

apparatus in which fractionation is carried out, consisting of a vertical cylindrical metal vessel, containing equipment for the proper contacting of flashed liquid and vapour

NOTE Heat is often supplied at the bottom of the column in a reboiler, whereas heat is withdrawn at the top in a condenser. Heat can also be supplied or withdrawn at intermediate heights of the column, if beneficial for the process (interheaters or intercoolers). The oil to be fractionated is feed into the column in one or more predetermined locations along the height of the column. The contacting equipment is formed by fractionating trays in the oil and chemical industries in general, while, for special chemical applications, packing material is used.

#### 4.50.210

##### **fractionating tray**

equipment aimed at promoting contact between vapour and liquid in fractionation

NOTE The flow can be of the single type (i.e. vapour and liquid are arranged to use separated apertures) or of the dual type (i.e. vapour and liquid may use the same aperture). The former type is promoted by the provision of **downcomers** (4.50.212) for the liquid. Various arrangements of downcomers lead to various systems of trays. Analogously there may be different provisions for the vapour passage, again leading to various possibilities of trays.

#### 4.50.211

##### **calming-section tray**

fractionating tray characterized by the presence of calming sections on a tray of the grid, sieve or valve variety, hence the names : c.s. gridtray, c.s. sieve tray and c.s. valve tray

NOTE Calming sections are actually downcomers, carefully designed and distributed over the tray area so as to ensure the best distribution of liquid.

#### 4.50.212

##### **downcomer**

##### **downspout**

device conveying liquid from one tray to the next one below it in a fractionating column

#### 4.50.220

##### **bubble cap tray**

fractionating tray consisting of a plate provided with holes and bubble caps, the latter causing the vapour to be distributed through the liquid

NOTE The flow is essentially of the single type. Bubble caps are made in a variety of designs, the more common type consisting of a circular cap inverted over a vapour riser of smaller diameter than the cap. The periphery of the cap, which clears the plate by a short distance, is slotted in order to disperse the vapour through the liquid as evenly as possible.

#### 4.50.230

##### **valve tray**

fractionating tray consisting of a plate with holes for vapour passage, characterized by the presence of valves over these holes

NOTE These valves are aimed at preventing liquid passage (if liquid pressure should become too high) while allowing flexibility in vapour passage (depending on the pressure of the vapour). The flow is meant to be of the single type, and downcomers are generally provided.

#### 4.50.300

##### **reboiler**

special type of heat exchanger for the supply of heat to the bottom of fractionating columns

**4.50.510**

**process water**

water which, after having been in contact with petroleum products, is recovered during the refining process

**4.60 Miscellaneous**

**4.60.010**

**refining**

processes such as distillation, cracking, etc. where

crude oil and other hydrocarbon feedstocks are converted into marketable commodities

**4.60.040**

**processing  
treatment**

group of operations that are performed on raw (primary) materials in the petroleum industry

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**Review of Indian Standards**

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards: Monthly Additions'.

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**Amendments Issued Since Publication**

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